# GOVERNMENT OF INDIA
# ATOMIC ENERGY
# LOK SABHA

UNSTARRED QUESTION NO:4143
ANSWERED ON:20.04.2005
APPLICATION OF NUCLEAR ENERGY FOR DEVELOPMENT OF RURAL AREAS
Ramadass Prof. M

**Will the Minister of ATOMIC ENERGY be pleased to state:**

(a) the details of application of nuclear energy for the development of rural areas;

(b) the objectives realized by the Breeder Test Reactor;

(c) the progress made by Bhabha Atomic Research Centre (BARC) in the design and development of advanced heavy water reactor; and

(d) the contribution made by BARC towards development of several control and instrumentation system for the nuclear power plants being set up by Nuclear Power Corporation of India Limited?

## Answer

THE MINISTER OF STATE IN THE PRIME MINISTER`S OFFICE (SHRI PRITHVIRAJ CHAVAN):
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(a) Nuclear energy has been applied in the following areas for rural development.

i) Crop improvement.
ii) Food preservation.
iii) Desalination of water.
iv) Health care and
v) Diagnosis and treatment of cancer.

(b) Fast Breeder Test Reactor (FBTR) has provided valuable experience in mastering sodium technology and operation of fast reactors. It has served as an excellent facility for research and development of fuel and structural materials. Feedback from the operating experience of FBTR has provided valuable inputs for design of 500 MWe Prototype Fast Breeder Reactor (PFBR) project, now under construction at Kalpakkam, Tamil Nadu.

(c) The design of Advanced Heavy Water Reactor (AHWR) has been completed. A peer review of AHWR has been conducted by the Nuclear Power Corporation of India Limited (NPCIL). Further optimization and validation of AHWR design is continuing. An integral test facility for the validation of thermal hydraulics and safety aspects of AHWR design has been commissioned in BARC. A critical facility for validation of physics design is in an advanced stage of construction. Work is in progress for pre-licensing appraisal by Atomic Energy Regulatory Board (AERB).

(d) For Tarapur Atomic Power Project unit-4, a 540 MWe reactor, which went critical in March 2005, BARC has developed many control and instrumentation systems such as Reactor Regulating System (RRS, which is safety related system), computer based reactor protection system no.1 (the primary safety system of the reactor), primary heat transport control system, steam generator control system (combined known as DPHS-PCS), Coolant Channel Outlet Temperature Monitoring System (CCOTMS), neutron Flux Mapping System (FMS) and amplifiers for self powered neutron detectors.

Many other Control and Instrumentation (C&I) systems, which are similar to those as in previous reactors, have been manufactured by the Electronics Corporation of India Limited (ECIL) based on BARC designs. However, prior to the commissioning of the 540 MWe reactor at Tarapur, BARC has developed C&I systems for NPCIL's power reactor at Madras Atomic Power Station (MAPS), Kakrapar Atomic Power Station (KAPS), Kaiga Atomic Power Station and Rajasthan Atomic Power Station (RAPS). Many C&I systems were developed as replacement for Tarapur 1 & 2 Boiling Water Reactors(BWR), the most notable being the Rod Worth Minimiser (RWM) system that ensured safe operational adjustments of the control rods avoiding rapid excursion of reactor power output.